

PATENT

Atty. Dkt. No. APPM/006766/CPML/B/PJS

AMENDMENTS TO THE CLAIMS

Please cancel claims 5-6, 9-10, 14 and 16-20, add claims 21-30 and amend the claims as follows:

1. (Currently Amended) An apparatus ~~capable of~~ for performing multiple deposition processes, comprising:

a chamber body; and

a lid assembly attached to the chamber body;

a first gas distribution assembly coupled to the lid assembly and configured for a cyclical layer deposition process, comprising:

a gas conduit positioned on and extending through the lid assembly and having an expanding channel in fluid communication with the chamber body;

~~two or more isolated gas inlets equipped with one or more high speed actuating valves in fluid communication with the gas conduit, the valves adapted to alternately pulse two or more gases into the gas conduit; and~~

a first gas inlet and a second gas inlet positioned on the gas conduit to form a circular gas flow pattern within the gas conduit; and

a first high speed actuating valve coupled to the first gas inlet, a second high speed actuating valve coupled to the second gas inlet and the first and second high speed actuating valves are configured to sequentially pulse a first gas and a second gas during the cyclical layer deposition process; and

a second gas distribution assembly coupled to the lid assembly and configured for a chemical vapor deposition process, comprising:

an annular mixing channel in fluid communication with the gas conduit [[, the mixing channel]] and adapted to deliver a continuous flow of one or more compounds into the gas conduit during the chemical vapor deposition process.

2. (Original) The apparatus of claim 1, wherein the gas conduit comprises a gradually increasing inner diameter.

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3. (Original) The apparatus of claim 1, wherein the gas conduit has a frusto-conical shape.

4. (Currently Amended) The apparatus of claim 1, wherein the annular mixing channel is in fluid communication with the gas conduit via one or more passageways ~~formed within the mixing channel.~~

5-6. (Cancelled)

7. (Currently Amended) An apparatus ~~capable of~~ for performing multiple deposition processes, comprising:

a chamber body; and

a lid assembly attached to the chamber body;

a first gas distribution assembly coupled to the lid assembly and configured for a cyclical layer deposition process, comprising:

a gas conduit in fluid communication with the chamber body positioned on and extending through the lid assembly;

at least two separate flow paths in fluid communication with the gas conduit at a first end thereof, wherein each isolated flow path having is coupled to one or more high speed actuating valves for enabling the cyclical layer deposition process; and

a second gas distribution assembly coupled to the lid assembly and configured for a chemical vapor deposition process, comprising:

an at least one annular mixing channel concentrically disposed about the gas conduit at a second end thereof, the mixing channel and in fluid communication with the gas conduit via one or more passageways; ~~formed therethrough; wherein the flow paths are isolated from the mixing channel by a pressure differential created within the gas distribution assembly~~

at least one nozzle connected to each of the one or more passageways and positioned to eject a gas into the gas conduit; and

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~~— a first gas inlet positioned on an inner wall of the annular mixing channel~~
to form a circular gas flow pattern for the gas within the annular mixing channel.

8. (Currently Amended) The apparatus of claim 7, wherein the ~~gas distribution assembly gas conduit~~ further comprises a ~~lid plate disposed on the chamber body, the lid plate having~~ a conical concave lower surface to help evenly distribute gases within the chamber body.

9-10. (Cancelled)

11. (Currently Amended) The apparatus of claim ~~10~~ 8, wherein the at least one nozzle ~~[[s are disposed]]~~ is radially positioned or substantially radially positioned ~~perpendicular~~ in relation to the gas conduit.

12. (Currently Amended) The apparatus of claim ~~10~~ 8, wherein the at least one nozzle ~~[[s are disposed at an angle]]~~ is tangentially positioned or substantially tangentially positioned in relation to the gas conduit.

13. (Currently Amended) The apparatus of claim 7, further comprising a second gas inlet positioned on ~~wherein the one or more passageways comprises a gap disposed within~~ an inner wall of the annular mixing channel.

14. (Cancelled)

15. (Currently Amended) The apparatus of claim 7, wherein the gas conduit comprises a gradually increasing inner diameter ~~from inlet to outlet~~ towards the chamber body.

16-20. (Cancelled)

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21. (New) The apparatus of claim 1, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof.
22. (New) The apparatus of claim 13, wherein the second gas inlet is positioned with the first gas inlet to form the circular gas flow pattern.
23. (New) The apparatus of claim 22, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof.
24. (New) An apparatus for performing multiple deposition processes, comprising:
- a substrate support having a substrate receiving surface and contained within a chamber body;
 - a lid assembly attached to the chamber body;
 - a process gas channel contained within a gas conduit positioned on and extending through the lid assembly and having an expanding channel in fluid communication with the substrate support;
 - a first gas distribution assembly coupled to the lid assembly and configured for a cyclical layer deposition process, comprising:
 - a first gas inlet and a second gas inlet positioned on the gas conduit to form a circular gas flow pattern within the process gas channel; and
 - a first high speed actuating valve coupled to the first gas inlet, a second high speed actuating valve coupled to the second gas inlet and the first and second high speed actuating valves are configured to enable sequential pulses of gases with a pulse time of about 1 second or less during the cyclical layer deposition process; and
 - a second gas distribution assembly coupled to the lid assembly and configured for a chemical vapor deposition process, comprising:
 - an annular mixing channel in fluid communication with the substrate support and adapted to deliver a continuous flow of one or more compounds into the process gas channel during the chemical vapor deposition process.

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25. (New) The apparatus of claim 24, wherein the pulse time is about 0.1 seconds or less.
26. (New) The apparatus of claim 25, wherein the circular gas flow pattern is selected from the group consisting of a vortex pattern, a spiral pattern and a derivative thereof.
27. (New) The apparatus of claim 24, wherein the annular mixing channel is in fluid communication with the gas conduit by a plurality of passageways formed through a surface of the gas conduit.
28. (New) The apparatus of claim 27, wherein each passageway of the plurality of passageways contains a nozzle positioned to eject the one or more compounds into the process gas channel.
29. (New) The apparatus of claim 28, wherein the nozzle is radially positioned or substantially radially positioned in relation to the gas conduit.
30. (New) The apparatus of claim 28, wherein the nozzle is tangentially positioned or substantially tangentially positioned in relation to the gas conduit.